ITEMS UNDER TESTS	
Descrizione *Description*	Display used for information system
Modello base *Basic Model type*	Compact TFT 32" Outdoor Code 993201900100
Modelli derivati *Derived Models type*	D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z0 D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z1
Identificativo interno *Storage No.*	190883 (sampled by customer)
Richiedente *Applicant*	Aesys S.p.A.
Indirizzo *Address*	Via Pastrengo, 7/C I-24068 Seriate (BG) - Italia
Prove effettuate presso *Test carried out by*	TÜV Rheinland Italia Srl Via E. Mattei, 3 – 20010 Pogliano Milanese (Italy)
Norme di riferimento *Reference Standards*	**Partial tests according to ETSI EN 301 511 V.12.5.1 (par. 5.3.16 & par. 5.3.17)**
Scopo delle prove *Scope of the tests*	To verify the compliance with the following clauses of reference standards • See summary of testing *TEST SUMMARY* section
Risultati di prova *Test Results*	**COMPLIANT**

Data ricevimento campioni *Date of samples receiving*	30/09/2019		
Data inizio prove *Date of tests start*	01/10/2019	**Data fine prove** Date of tests end	23/10/2019
Rapporto composto da *Test report composed by*	25 Pages		

Provato da / Tested by *(name + signature)*	**Approvato da / Approved by** *(name + signature)*
Andrea Bortolotti *(Laboratory Technician)*	Roberto Radice (Reviewer)

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The laboratory declines all responsibility for the data provided by the customer and reported in this test report
The results referred in this report are only relevant to the samples tested and described in this report.
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RELEASE CONTROL RECORD		
TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
28118771 004	Original release	20/10/2020

OGGETTO SOTTOPOSTO A PROVE / *ITEM UNDER TEST*	
Descrizione *Description*	Display used for information system
Marca *Brand*	aesys
Costruttore *Manufacturer*	Aesys S.p.A.
Modello base *Basic Model / Type reference*	Compact TFT 32” Outdoor Code 993201900100
Dati di targa *Ratings*	
Classificazione *EUT classification*	---
Massima frequenza di clock *Maximum clock frequency*	---
Installazione *Standing*	Wall / Ceiling / Embedded / Pole support

PRODUCT DESCRIPTION

This display can be part, with any other panels similar or of different types, of a system aimed at informing users in transit on rail vehicles of information to travelers on the railway lines, or general information.

Mechanical	
Size:	TFT 32"
Dimensions:	836 (L) x 530 (H) x 160 (D) mm
Estimated Weight	45Kg

Finish Front :	Aluminum, RAL Range, 50% GLOSS, not reflecting MAT, powder coating		
Finish Rear :	Aluminum, RAL Range, 50% GLOSS, not reflecting MAT, powder coating		
Protection grade:	IP55		
Front protection:	Antireflective (both side) Laminated Tempered glass with UV and IR protection (compliance to IK08 5J according to the EN62262)		
Lock system:	Hinged door, polyurethane bi-component vulcanized gasket; Special anti-vandal locks		
Interfaces:	1x Power Supply 1x RJ45 Data Line 1x M6 Additional ground interface 3x SMA connector (for Wireless 2G/3G/4G version, RF antenna & Wi.fi) 1x Audio Output (for further details see the attached mechanical drawing)		
Fixing points:	Monitor : Vesa standard 200x200mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)	Monitor : Vesa standard 400x400mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)	Monitor : Vesa standard 400x400mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)
Other:	Mechanical housing compliant to IK10 20J according to the EN62262		

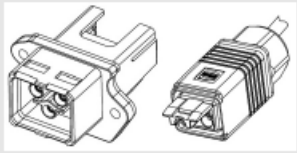
Electrical	
Size	TFT 32"
Input power supply voltage:	Nominal 220-240V$_{AC}$
	Range: 198V$_{AC}$ ÷ 264V$_{AC}$
Input power supply frequency range:	50/60Hz
Protections:	Overload, overvoltage, over temperature
Power Consumption:	Typ.: 130W (@Brightness 70%)
	Max.: 165W (@ Brightness 100%)
	Max.: 325W (@ Brightness 100%, Heating ON)

Environmental	
Operating temperature:	-25° ÷ 50° C when installed with Suncover / Sunshade
Thermal management:	At high temperature: - Automatic TFT-LCD matrix brightness linear derating down to maximum 50% with the increase of the environmental temperature - TFT-LCD matrix and PC switched OFF when the highest temperature limit is reached
	At low temperature: - display is switched off when the lowest temperature limit is reached
Operating humidity:	10 % ÷ 95 % R.H. without condensation
Storage temperature:	-20° ÷ 60° Celsius – Ambient temperature 10% ÷ 95% - R.H. at this conditions: - till +40°C @90% R.H. - till +50°C @60% R.H. - till +60°C @40% R.H.
Cooling system:	Direct air exchange with the outside by special filter
Heating system:	Installed
Temperature Sensor	Installed
Light Sensor	Installed
Acceleration Sensor	*Upon request*

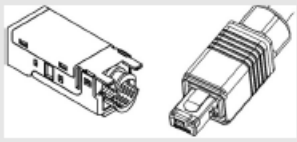
Data Communication	
Type of communication:	Copper LAN Ethernet 10/100/1000 Base TX
Protocol type:	Different protocol types supported (according to the software player hosted), SNMP protocol for diagnostic data
Other:	*Upon request:* *- Built-in LAN Ethernet 10/100/1000Base TX to 10/100/1000Base FX Media converter (multimode)* *- Wireless 2G/3G/4G* *- Wi-fi* *(for further details refer to the commercial offer)*
Connectors	
Power supply:	1x Harting PushPull Power 2/0, panel feed-through and connector, 3-poles (2+PE)
Data line:	1x Harting PushPull RJ45 Technology, RJ45-panel jack feed-through
Audio output:	1x Cable Gland
Antenna:	3x SMA Connector
Ground interface:	1x M6 male ground point

Optical specifications (matrix module)	
Size:	TFT 32"
Format:	16:9
Type:	Normally black
(*) Active area:	698.4 (H) x 392.85 (V) mm
(*) Pixel pitch:	0.36375 x 0.36375 mm x RGB
Pixel format:	1920 (H) x 1080 (V) (Native resolution)
Colour depth:	16.7M colors
Luminance:(on white colour)	1.000 cd/m^2 (typ.) @ Center point
Contrast ratio:	4000 : 1 typ. (with dimming)
Viewing angle (CR > 10):	R/L 178° (typ.) – U/D 178° (typ.)
Response time:	8ms (Typ., Grey-to-Grey)
Backlight Technology:	LED

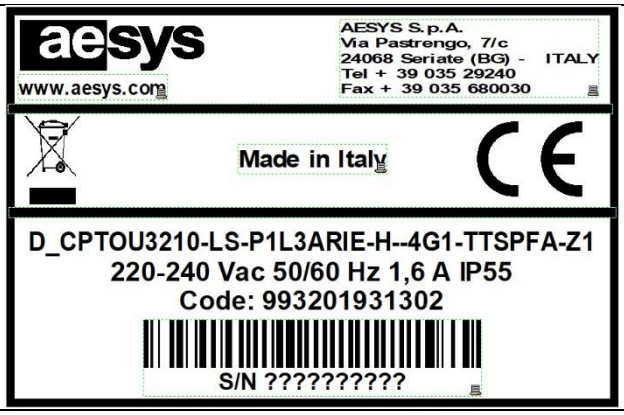
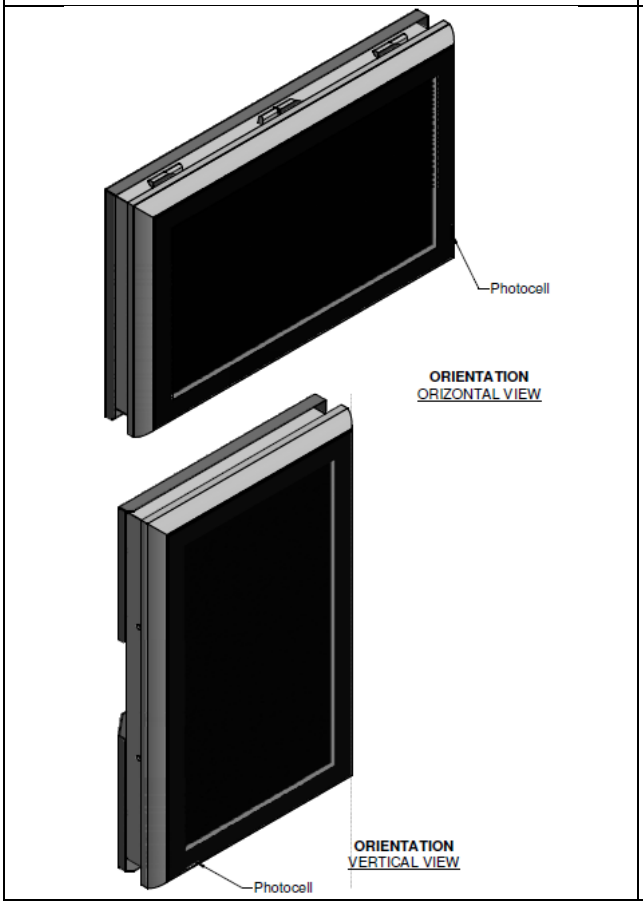
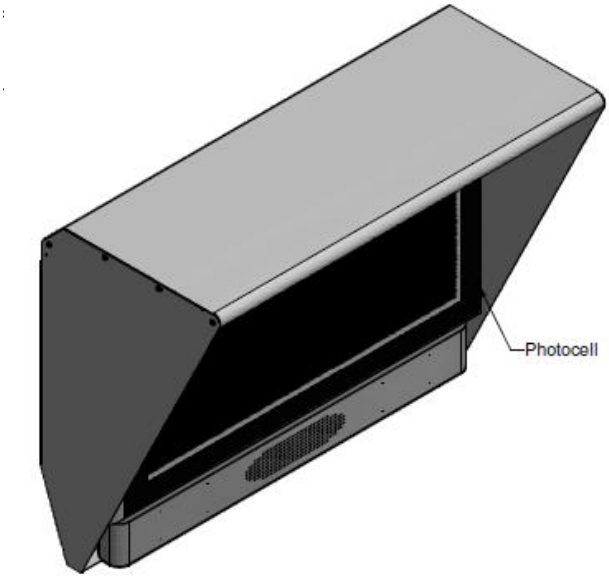
Power Supply

Connector Type	Pin #	Signal	Description
 Harting Push pull V4 Power plug	1	L	Line 230Vac power input
	2	N	Neutral 230Vac power input
	3	GND	Ground

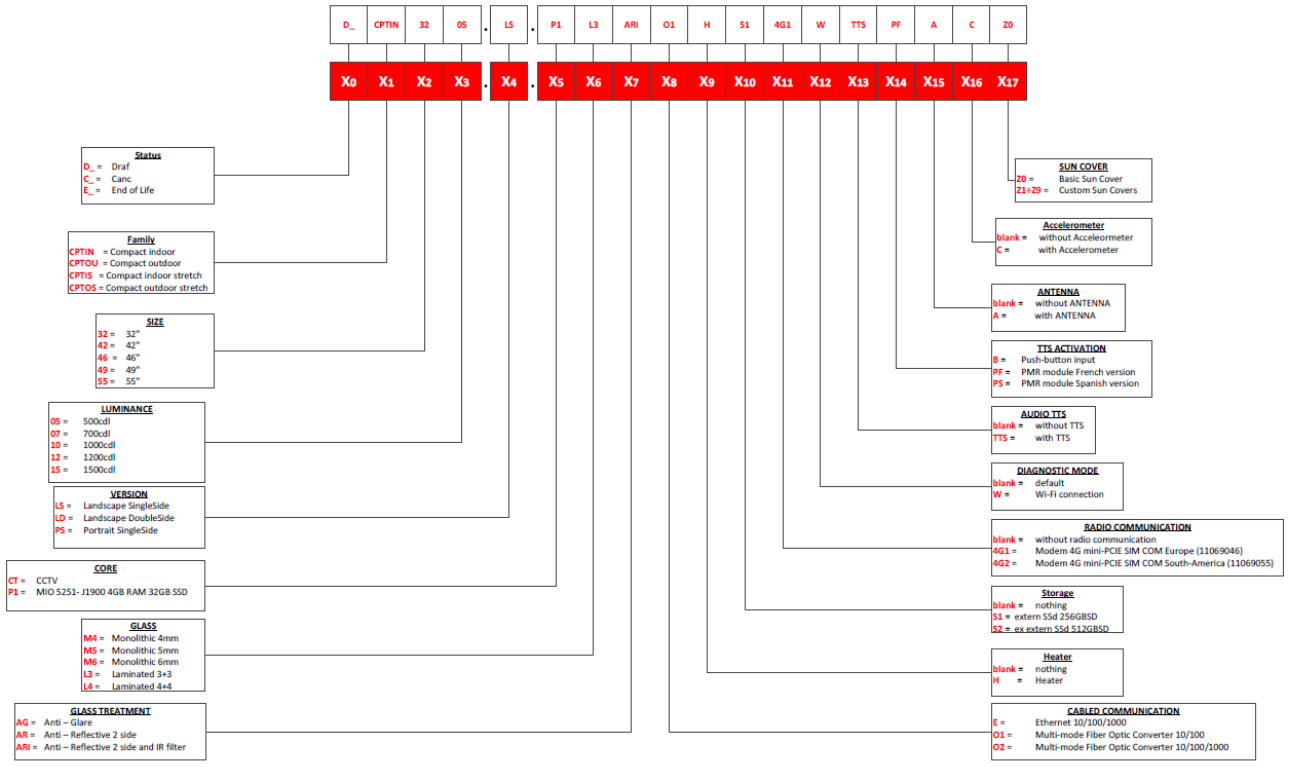
Ethernet data line

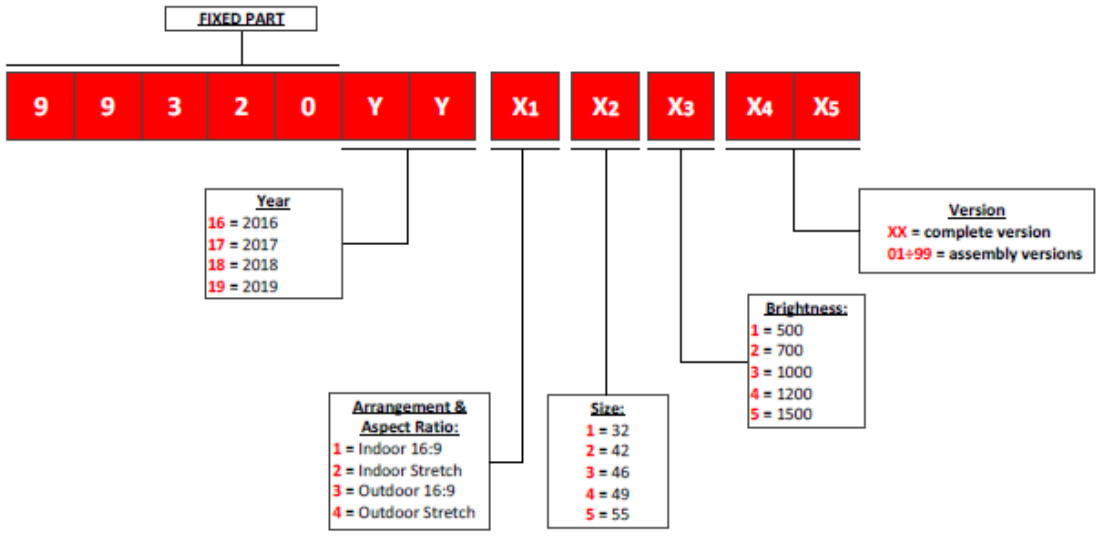
Connector Type	Pin #	Signal	Description
 Harting Push pull V4 RJ45	1	TX+	Transmit Data +
	2	TX-	Transmit Data -
	3	RX+	Receive Data +
	4	BI_DC+ (GHz)	DC+ for GBe
	5	BI_DC- (GHz)	DC- for GBe
	6	RX-	Receive Data -
	7	BI_DD+ (GHz)	DD+ for GBe
	8	BI_DD- (GHz)	DD- for GBe

Derived model(s)

D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z0	D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z1
	
Commercial name	Sun cover
	

Speaking code


D_ CPTIN 32 05 . LS . P1 L3 ARI O1 H S1 4G1 W TTS PF A C Z0
X0 X1 X2 X3 . X4 . X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17
Status
D_ = Draf
C_ = Canc
E_ = End of Life
Family
CPTIN = Compact indoor
CPTOU = Compact outdoor
CPTIS = Compact indoor stretch
CPTOS = Compact outdoor stretch
SIZE
32 = 32"
42 = 42"
46 = 46"
49 = 49"
55 = 55"
LUMINANCE
05 = 500cdl
07 = 700cdl
10 = 1000cdl
12 = 1200cdl
15 = 1500cdl
VERSION
LS = Landscape SingleSide
LD = Landscape DoubleSide
PS = Portrait SingleSide
CORE
CT = CCTV
P1 = MIO 5251- J1900 4GB RAM 32GB SSD
GLASS
M4 = Monolithic 4mm
M5 = Monolithic 5mm
M6 = Monolithic 6mm
L3 = Laminated 3+3
L4 = Laminated 4+4
GLASS TREATMENT
AG = Anti – Glare
AR = Anti – Reflective 2 side
ARI = Anti – Reflective 2 side and IR filter
SUN COVER
Z0 = Basic Sun Cover
Z1÷Z9 = Custom Sun Covers
Accelerometer
blank = without Acceleormeter
C = with Acceleormeter
ANTENNA
blank = without ANTENNA
A = with ANTENNA
TTS ACTIVATION
B = Push-button input
PF = PMR module French version
PS = PMR module Spanish version
AUDIO TTS
blank = without TTS
TTS = with TTS
DIAGNOSTIC MODE
blank = default
W = Wi-Fi connection
RADIO COMMUNICATION
blank = without radio communication
4G1 = Modem 4G mini-PCIE SIM COM Europe (11069046)
4G2 = Modem 4G mini-PCIE SIM COM South-America (11069055)
Storage
blank = nothing
S1 = extern SSd 256GBSD
S2 = ex extern SSd 512GBSD
Heater
blank = nothing
H = Heater
CABLED COMMUNICATION
E = Ethernet 10/100/1000
O1 = Multi-mode Fiber Optic Converter 10/100
O2 = Multi-mode Fiber Optic Converter 10/100/1000



RADIO MODULE - - TECHNICAL DATA DECLARED BY THE MANUFACTURER

Simcom SIM7100E

General features	**Specifications for Data transfer**
Five-Band FDD-LTE B1/B3/B7/B8/B20 Dual-Band TDD-LTE B38/B40 Dual-Band UMTS/HSDPA/HSPA+ B1/B8 Dual-Band GSM/GPRS/EDGE 900/1800 MHz Control Via AT Commands Supply voltage range: 3.4V~ 4.2V Operation temperature: -40℃ to +85℃ Dimension: 30 X 30X 2.9 mm Weight: 5.8g GNSS: gpsOne Gen 8B;standalone;assisted,XTRA;	LTE •Uplink up to 50Mbps •Downlink up to 100Mbps HSPA+ •Uplink up to 5.76 Mbps •Downlink up to 42 Mbps UMTS •Uplink/Downlink up to 384Kbps EDGE Class: •Max. 236.8Kbps(DL),Max. 236.8Kbps(UL) GPRS •Max. 85.6Kbps(DL), Max. 85.6Kbps(UL) CSD •GSM data rate 14.4Kbps •WCDMA data rate 57.6Kbps •WCDMA 64kbps CSD for Video call
Other features	**Interfaces**
USB Driver for Microsoft Windows2000/XP/Vista/7/8 USB Driver for Windows CE/Mobile USB Driver for Linux /Android RIL supporting for Android/Windows CE/Mobile Automatic installation for windows Linux API SDK Firmware update via USB TCP/IP/IPV4/V6 Multi-PDP,MT PDP FTP/FTPS/HTTP/HTTPS/SMTP/POP3/DNS/MMS DTMF Gobi SDK to the Win7/Win8/Linux MBIM to Win8 Source code of the PC manager of the device for reference	USB2.0 UART SIM card SPI I2C Keypad(5*5) Constant current sink GPIO ADC PCM SDIO

COMPONENTI AUSILIARI / *ANCILLARY EQUIPMENTS*		
Description	**Manufacturer**	**Model name**
RADIO TEST SET	R&S	CMW500
Remote control	Aesys	---

INTERFACE PORTS				
Port	**Description**	**Connection**	**Shielded**	**Cable length**
Enclosure	Conductive surface	Closed by screws	---	---
AC Power Port	Main Input	Input 230V 50/60Hz (Phase/Neutral with protective earth)	No	---
DC Power Port	Port not present			
Analogue/digital data ports	---	Port not present	No	<3m.
Wired Network port	Ethernet data line	RJ45 connector	Yes	>3mt
*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports				

OPERATING MODES	
#1	Equipment supplied at 230Vac 50Hz in stand-by mode. GSM/GPRS module SYNCRONYZED at channel 60 (902 MHz) at max. power
#2	Equipment supplied at 230Vac 50Hz in stand-by mode. GSM/GPRS module SYNCRONYZED at channel 700 (1747,8 MHz) at max. power
#3	Equipment supplied at 230Vac 50Hz in stand-by mode. GSM/GPRS module in Idle mode (synchronized) at channel 60 (902 MHz)
#4	Equipment supplied at 230Vac 50Hz in stand-by mode. GSM/GPRS module in Idle mode (synchronized) at channel 700 (1747,8 MHz)

Reference Document	**Title of Document**
ETSI EN 301 511 V.12.5.1	Global System for Mobile communications (GSM); Mobile Stations (MS) equipment; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
ETSI TS 151 010-1 V.12.8.0	Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification; Part 1: Conformance specification (3GPP TS 51.010-1 version 12.8.0 Release 12)".

CONFORMANCE REQUIREMENTS

The present report contains all requirements that are needed for terminals integrating a GSM or GPRS module already type approved to meet the essential requirement as defined in the Directive RED (2014/53/UE Article 3.2)
It concerns only SPURIOUS EMISSIONS requirements and relevant tests according to the harmonized standard EN 301 511 V.12.5.1, sub-clauses 4.2.12 to 4.2.19.
The spurious power emitted by the MS, when SYNCRONYZED a channel, shall be no more than the levels in table 12.1 (conducted spurious) and table 12.7 (radiated) of TS 151 010-1 :
• Under normal voltage conditions; 3GPP TS 05.05, sub clauses 4.3 and 4.3.3

CONDUCTED SPURIOUS EMISSIONS

In particular, to verify the compliance to SPURIOUS EMISSIONS the relevant standards require :
- Conducted spurious emissions for all types of terminals integrating GSM 400, GSM 900 and DCS 1 800 MS with a permanent antenna connector will be measured in

- idle mode and with MS SYNCRONYZED in a channel
- in the frequency band ***100 kHz to 12,75 GHz*** excluding the following received bands:

For GSM 400, GSM 900 and DCS 1 800:
- the band 925 MHz to 960 MHz;
- the band 1 805 MHz to 1 880 MHz;

In addition for GSM 400 MS:
- the band 460,4 MHz to 467,6 MHz;
- the band 488,8 MHz to 496 MHz

For GSM 700, GSM 850 and PCS 1 900:
- the band 747 MHz to 762 MHz;
- the band 869 MHz to 894 MHz;
- the band 1 930 MHz to 1 990 MHz.

RADIATED SPURIOUS EMISSIONS

Radiated spurious emissions , also known as "cabinet radiation", for all types of GSM 400, GSM 900 and DCS 1 800 MS. The test applies to all types of GSM 400, GSM 900 and DCS 1 800 MS with the exception of the test at extreme voltages for an MS where a practical connection, to an external power supply, is not possible, will be measured in :

- idle mode and with MS SYNCRONYZED in a channel
- in the frequency band ***30 MHz to 4 GHz*** excluding the following received bands:

For GSM 400, GSM 900 and DCS 1 800:
- the band 925 MHz to 960 MHz;
- the band 1 805 MHz to 1 880 MHz;

In addition for GSM 400 MS:
- the band 460,4 MHz to 467,6 MHz;
- the band 488,8 MHz to 496 MHz

For GSM 700, GSM 850 and PCS 1 900:
- the band 747 MHz to 762 MHz;
- the band 869 MHz to 894 MHz;
- the band 1 930 MHz to 1 990 MHz.

TESTS SUMMARY

RADIATED SPURIOUS EMISSIONS – MS SYNCRONYZED A CHANNEL, GSM 900MHZ BAND 14

RADIATED SPURIOUS EMISSIONS – MS IN IDLE MODE, GSM 900MHZ BAND 17

RADIATED SPURIOUS EMISSIONS – MS SYNCRONYZED A CHANNEL, DCS 1800MHZ BAND 20

RADIATED SPURIOUS EMISSIONS – MS IN IDLE MODE, DCS 1800MHZ BAND.....23

TESTS RESULTS

No.	Description	Mode	Results
1	Radiated spurious emissions	MS SYNCRONYZED a channel, GSM 900MHz Band	PASS
2	Radiated spurious emissions	MS in idle mode, GSM 900MHz Band	PASS
3	Radiated spurious emissions	MS SYNCRONYZED a channel, DCS 1800MHz Band	PASS
4	Radiated spurious emissions	MS in idle mode, DCS 1800MHz Band	PASS

Legend:

PASS = Result within the limits

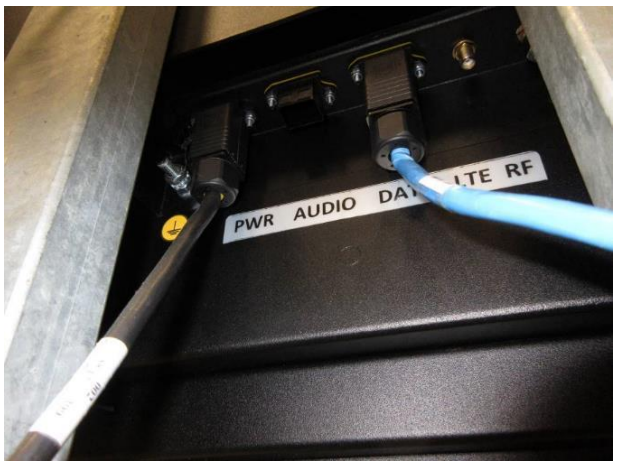
N/A = Not Applicable

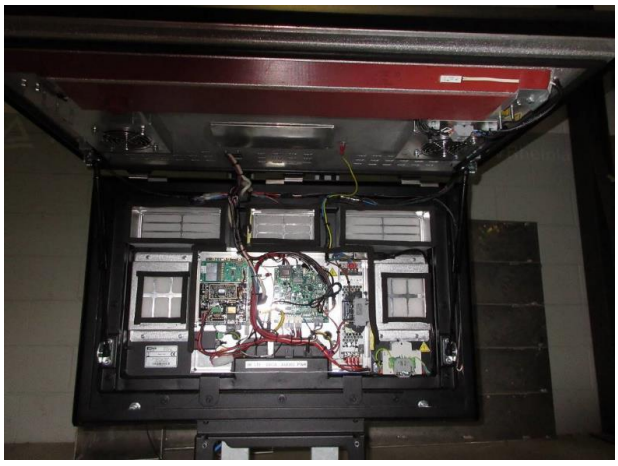
N/R = Not requested by the Client

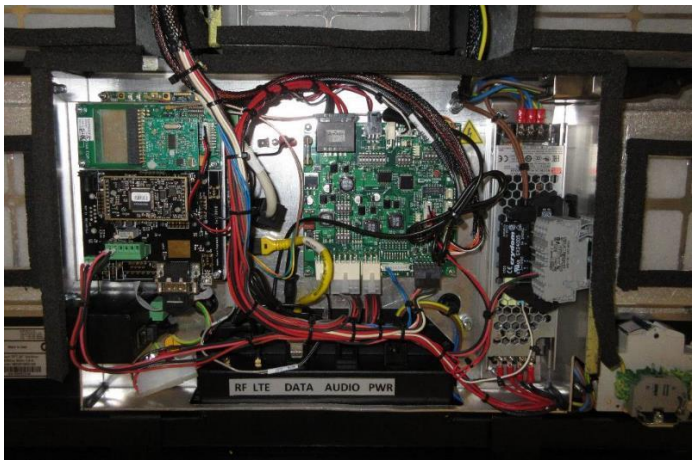
Decision rule

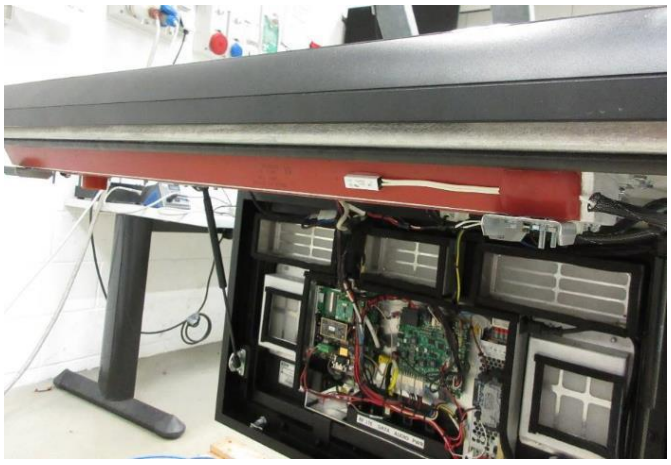
Statements of conformity (PASS or FAIL) to specifications are made in this report without taking measurement uncertainty into account. Where statements of conformity are made in this report, the following decision rules are applied:
PASS – Results within limits/specifications, FAIL – Results exceed limits/specifications
(emission test according to CISPR 16-4-2 cl.4.2, immunity tests TRI applies the disturbance level indicated in the product standard)

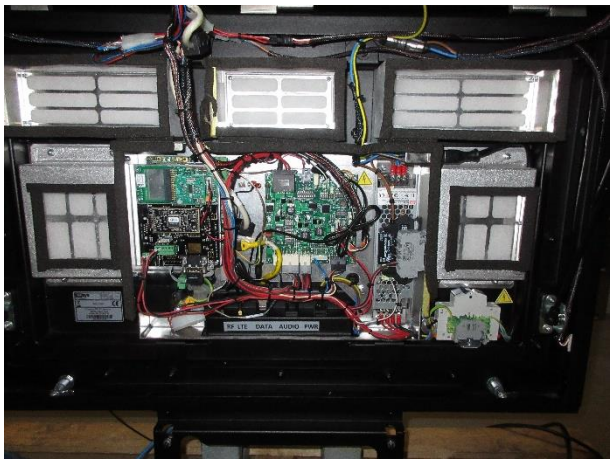
PHOTOGRAPHIC DOCUMENTATION

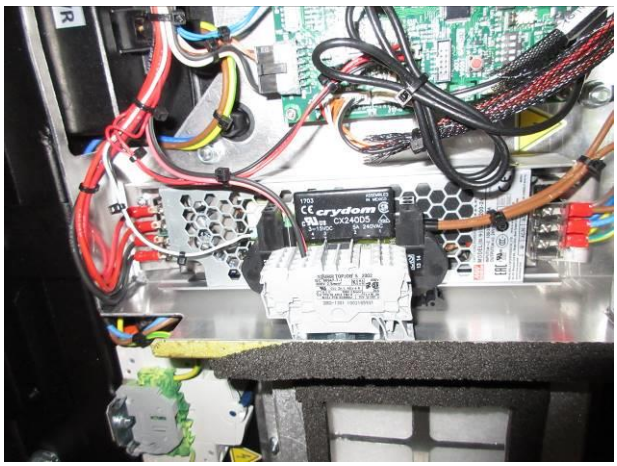

PWR AUDIO

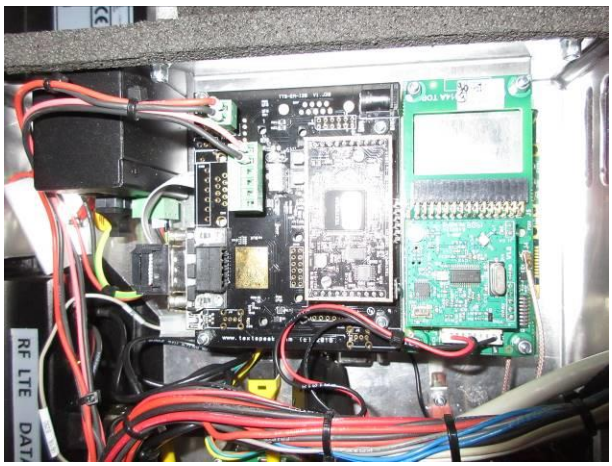



RF LTE DATA AUDIO PWR

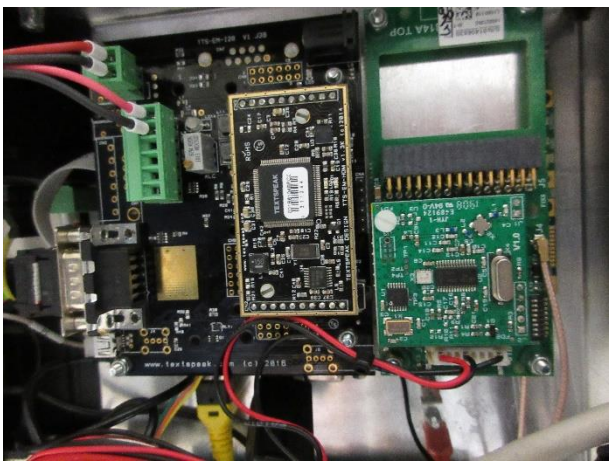





crydom
CX2405


RF LTE DATA

UI2 UCHIYA 3
110C 164



Test N.1	**RADIATED SPURIOUS EMISSIONS – MS SYNCRONYZED A CHANNEL, GSM 900MHZ BAND**

Reference Standard	ETSI TS 151 010-1 V.12.8.0
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ EMI Test Receiver R&S mod. ESW44 (Inv. 87020967) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348) ➢ Tunable Notch Filter WTRCT5-880-960-0.2-1.2-40SSK (Inv. 2782708)

Measurement Uncertainty

Frequency:	Expanded uncertainty:	Coverage probability:	Coverage factor:
9kHz-1GHz	2,7 dB	95%	2,3
1-8GHz	3,3 dB	95%	2,3
8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	Temperature	Relative Humidity
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – Integral Antenna)

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.
NOTE: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 12.8. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.

NOTE 1: This ensures that both the active times (MS transmitting) and the quiet times are measured.

NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

Limits

Frequency range	Power level in dBm		
	GSM 400, GSM 900	DCS 1 800	PCS 1 900
30 MHz to 1 GHz	-36	-36	-36
1 GHz to 4 GHz	-30		-30
1 GHz to 1 710 MHz		-30	
1 710 MHz to 1 785 MHz		-36	
1 785 MHz to 4 GHz		-30	

Normal test conditions						
GSM 900	**Cabinet radiation (integrated antenna)**					**MS SYNCRONYZED a channel**
Channel: 60	**Power control level: 5 (33dBm)**			**Test temperature: 24°C**		**Voltage: 230V~ 50Hz**
Frequency range (MHz)				**RBW (KHz)**		**VBW (KHz)**
30-50				10		30
50-500				100		300
500-850				3000		3000
850-860				1000		3000
860-870				300		1000
870-896				100		300
896-900,2				30		100
900,2-903,8				Exclusion band		
903,8-908				30		100
908-925				100		300
925-935				300		1000
935-945				1000		3000
945-1000				3000		3000
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-36	---
1000-4000				3000		3000
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-30	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

Test N.2	**RADIATED SPURIOUS EMISSIONS – MS IN IDLE MODE, GSM 900MHZ BAND**

Reference Standard	ETSI TS 151 010-1 V.12.8.0
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ EMI Test Receiver R&S mod. ESW44 (Inv. 87020967) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348)

Measurement Uncertainty

Frequency:	Expanded uncertainty:	Coverage probability:	Coverage factor:
9kHz-1GHz	2,7 dB	95%	2,3
1-8GHz	3,3 dB	95%	2,3
8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	Temperature	Relative Humidity
Normal Temperature	15 to 35 °C	20% to 75%

Test Conditions	Parameter	Measured
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – Integral Antenna)

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.
NOTE: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 12.8. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.

NOTE 1: This ensures that both the active times (MS transmitting) and the quiet times are measured.

NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

Limits

Frequency range	Power level in dBm
	GSM 400, GSM 900, DCS 1 800
30 MHz to 880 MHz	-57
880 MHz to 915 MHz	-59
915 MHz to 1000 MHz	-57
1 GHz to 1 710 MHz	-47
1 710 MHz to 1 785 MHz	-53
1 785 MHz to 4 GHz	-47

Normal test conditions						
GSM900	**Cabinet radiation (integrated antenna)**				**MS IDLE mode**	
Channel: 60			**Test temperature: 24°C**		**Voltage: 230V~ 50Hz**	
Frequency range (MHz)			**RBW (KHz)**		**VBW (KHz)**	
30-880			10		30	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-57	---
880-915			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-59	---
915-1000			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-57	---
1000-1710			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-47	---
1710-1785			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-53	---
1785-4000			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-47	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

Test N.3	**RADIATED SPURIOUS EMISSIONS – MS SYNCRONYZED A CHANNEL, DCS 1800MHZ BAND**

Reference Standard	ETSI TS 151 010-1 V.12.8.0
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ EMI Test Receiver R&S mod. ESW44 (Inv. 87020967) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348) ➢ Tunable Notch Filter WTRCD5-1710-1880-0.2-1.6-40SSK (Inv. 2782709)

Measurement Uncertainty

Frequency:	**Expanded uncertainty:**	**Coverage probability:**	**Coverage factor:**
9kHz-1GHz	2,7 dB	95%	2,3
1-8GHz	3,3 dB	95%	2,3
8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – Integral Antenna)

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.
NOTE: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 12.8. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.

NOTE 1: This ensures that both the active times (MS transmitting) and the quiet times are measured.

NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

Limits

Frequency range	Power level in dBm		
	GSM 400, GSM 900	DCS 1 800	PCS 1 900
30 MHz to 1 GHz	-36	-36	-36
1 GHz to 4 GHz	-30		-30
1 GHz to 1 710 MHz		-30	
1 710 MHz to 1 785 MHz		-36	
1 785 MHz to 4 GHz		-30	

Normal test conditions						
DCS 1800	**Cabinet radiation (integrated antenna)**				**MS SYNCRONYZED a channel**	
Channel: 700	**Power control level: 0 (30dBm)**		**Test temperature: 24°C**		**Voltage: 230V~ 50Hz**	
Frequency range (MHz)			**RBW (KHz)**		**VBW (KHz)**	
30-50			10		30	
50-500			100		300	
500-1000			1000		3000	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-36	---
1000-1680			3000		10000	
1680-1690			1000		3000	
1690-1700			300		1000	
1700-1741,8			100		300	
1741,8-1746			30		100	
1746-1749,6			Exclusion band			
1749,6-1753,8			30		100	
1753,8-1795			100		300	
1795-1805			300		1000	
1805-1815			1000		3000	
1815-2300			3000		3000	
2300-4000			3000		3000	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-30	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

Test N.4	**RADIATED SPURIOUS EMISSIONS – MS IN IDLE MODE, DCS 1800MHZ BAND**

Reference Standard	ETSI TS 151 010-1 V.12.8.0
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ EMI Test Receiver R&S mod. ESW44 (Inv. 87020967) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348)

Measurement Uncertainty

Frequency:	**Expanded uncertainty:**	**Coverage probability:**	**Coverage factor:**
9kHz-1GHz	2,7 dB	95%	2,3
1-8GHz	3,3 dB	95%	2,3
8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – Integral Antenna)

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.
NOTE: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 12.8. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.

NOTE 1: This ensures that both the active times (MS transmitting) and the quiet times are measured.

NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

Limits

Frequency range	Power level in dBm
	GSM 400, GSM 900, DCS 1 800
30 MHz to 880 MHz	-57
880 MHz to 915 MHz	-59
915 MHz to 1000 MHz	-57
1 GHz to 1 710 MHz	-47
1 710 MHz to 1 785 MHz	-53
1 785 MHz to 4 GHz	-47

Normal test conditions						
DCS 1800	**Cabinet radiation (integrated antenna)**				**MS IDLE mode**	
Channel: 700			**Test temperature: 24°C**		**Voltage: 230V~ 50Hz**	
Frequency range (MHz)			**RBW (KHz)**		**VBW (KHz)**	
30-880			10		30	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-57	---
880-915			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-59	---
915-1000			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-57	---
1000-1710			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-47	---
1710-1785			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-53	---
1785-4000			100		300	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	-47	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

END OF TEST REPORT